IN RE COMPLIANCE WITH 35 U.S.C. 120

Please insert the following in front of the specification.

"This is a continuation of application Serial No. 555,426, filed November 23, 1983; which was a continuation of application Serial No. 178,107, filed August 14, 1980, now abandoned."

IN RE TITLE

Applicant herewith proposes the following new title:

"INVERTER HAVING SINUSOIDAL GROUND-REFERENCED OUTPUT"

CLAIM AMENDMENTS

Please amend the claims as follows.

118. (Twice amended) In an inverter adapted to be powered from a DC source having a ground-connected center-tap and to provide an AC voltage output, said inverter comprising a pair of alternatingly conducting switching transistors connected by way of a mid-point in series across said DC source, said AC voltage output being provided between said center-tap and said mid-point, the improvement comprising:

a series-connected combination of an inductor and a capacitor connected between said center-tap and said mid-point, said series-connected combination: i) having a natural resonance frequency that is not higher than the fundamental frequency of said AC voltage, ii) [and] being operative to cause current drawn from said AC voltage output to be substantially sinusoidal in waveshape, and iii) having two terminals, one of which is connected with said center-tap; and

means to permit connection of a load in circuit with said series-connected combination.[; and]

[a diode means connected across each of said transistors;]

[thereby permitting the inductor and the capacitor to: i) receive energy from the DC source by forward conduction of the transistors, and ii) return energy to the DC source by forward conduction of the diodes.]

120. (Twice amended) In an inverter adapted to be powered from a DC source having a center-tap and to provide an AC voltage output, said DC source being powered by way of rectifier means from two power line terminals connected with an ordinary electric utility power line, said inverter comprising a pair of alternatingly conducting switching transistors connected by way of a mid-point in series across said DC source, said AC voltage output being provided between said center-tap and said mid-point, the improvement comprising:

[load] means for connecting an external load in circuit [connected] between said center-tap and said mid-point in such a way that one side of this external load is directly connected with said center-tap, said external load comprising no reactive elements and consuming substantially all the power being provided by said AC voltage output; and

connect means connecting said center-tap with one of said power line terminals.[;]

[whereby one side of the load means is directly connected with one of said power line terminals.]

121. (Twice amended) A frequency converter means adapted to be powered from a pair of input terminals connected with an ordinary electric utility power line and operative to provide substantially all of its output power to [a] an external load in the form of an AC voltage of frequency substantially higher than that of the voltage on said power line, said external load comprising no reactive elements, said frequency converter comprising:

rectifier-filter means connected in circuit with said pair of input terminals and operative to function as a center-tapped source of DC voltage, said source's center-tap being connected directly with one of said input terminals;

a pair of alternatingly conducting switching transistors connected by way of a mid-point in series across said center-tapped source of DC voltage and operative to provide said AC voltage between said mid-point and said center-tap; and

connect means operative to connect the external load between said mid-point and said center-tap;

whereby one side of said external load is directly connected with one of said input terminals.

122. (Twice amended) In an inverter adapted to be powered from a DC source having a ground-connected center-tap and to provide an AC voltage output, said AC voltage being of substantially trapezoidal waveshape, said inverter comprising a pair of alternatingly conducting switching transistors connected by way of a mid-point in series across said DC source, said AC voltage output being provided between said center-tap and said mid-point, the improvement comprising:

a series-connected combination of an inductor and a capacitor connected between said center-tap and said mid-point, said series-connected combination having a natural resonance frequency that is not higher than the fundamental frequency of said AC voltage but yet being operative to cause a substantially sinusoidal current to flow through said combination in response to said AC voltage, said combination having two terminals, one of those terminals being connected with said center-tap; and

means to permit connection of a load in circuit with said [capaitor] capacitor.

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124. (Amended) In a ballasting circuit for a gas discharge lamp, said ballasting circuit comprising a self-oscillating inverter adapted to provide an AC voltage across a pair of output terminals, the improvement comprising:

a series-combination of an inductor and a capacitor connected across said pair of output terminals, said series-combination having a natural resonance frequency;

connect means for connecting said gas discharge lamp in parallel with one of the components of [circuit with] said series-combination; and

feedback means connected in circuit with said series-combination and operative to cause the inverter to self-oscillate at a frequency higher than said natural resonance frequency.

Please cancel claim 126 and replace it with the following new claim.

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129. In an inverter powered by a DC voltage and operable to provide substantially all its AC output power from an AC voltage present at a set of output terminals, an L-C resonant circuit being connected with said output terminals and operative to make said AC voltage substantially sinusoidal in waveshape, said L-C circuit having a natural resonance frequency about equal to or higher than the frequency of said AC voltage, said inverter having a set of input terminals, the improvement comprising:

positive feedback means connected in circuit between said output terminals and said input terminals, and operative in cooperation with said L-C circuit to cause said inverter to self-oscillate, thereby to provide said substantially sinusoidal AC voltage at said output terminals, said feedback means comprising saturable inductor means.

127. (Amended) In a circuit for powering a load, said circuit comprising a self-oscillating inverter adapted to provide [an] a substantially sinusoidal AC voltage across a pair of output terminals, the improvement comprising:

a series-combination of an inductor and a capacitor connected across said pair of output terminals, said series-combination having a natural resonance frequency;

connect means for connecting said load in parallel with one of the components of [circuit with] said series-combination; and

feedback means connected in circuit with said series-combination and operative to cause said inverter to self-oscillate at [a] an inverter frequency approximately equal to or higher than said resonance frequency, said feedback means comprising saturable inductor means co-determinative with said series-combination in establishing said inverter frequency.

128. (Amended) In an arrangement for powering a load, said arrangement comprising a self-oscillating inverter adapted to provide [an] a substantially sinusoidal AC voltage across a pair of output terminals, the improvement comprising:

a resonance circuit comprising an inductor and a capacitor connected with said pair of output terminals, said resonance circuit having a natural resonance frequency;

connect means for connecting said load in parallel circuit with said capacitor [with said resonance circuit]; and

feedback means connected with said resonance circuit and operative to cause said inverter to self-oscillate at [a] an inverter frequency approximately equal to or higher than said natural resonance frequency, said feedback means comprising saturable inductor means co-operative with said resonance circuit in establishing said inverter frequency.

ARGUMENTS IN SUPPORT OF CLAIMS

In re Independent Claim 118

Examiner rejected claim 118 under 35 U.S.C. 103 as being unpatentable over Rhoads in view of the British reference or Walden and Locklair.

Applicant traverses Examiner's rejection for the following reasons.

a) The Walden reference did not become public knowledge until 08/24/82, which is well after the date of filing of the parent of the present application; which parent application was filed on 08/14/80. Consequently, in view of Authority #6, there is clearly no basis for applying the Walden reference as evidence of obviousness.

b) The British reference does teach the use of a series-resonant L-C circuit in some connection with the output circuit. However, the L-C series-resonant circuit of the British reference can hardly be considered as being connected "across the load terminals of an inverter", as Examiner asserts. Yet, to make the distinction even clearer, Applicant has amended claim 118 by providing for one side of the L-C series-resonant circuit to be connected with ground.

c) Even if, as Examiner asserts, "it is old to place a series resonant LC circuit across the load terminals of an inverter", it would not therefore be obvious to combine such a feature with the circuit of Rhoads -- especially not in the position where one side of the L-C circuit is connected with ground. Examiner has never-the-less asserted obviousness. However, as required in accordance with MPEP 706.02(c), Examiner has not provided an explanation therefor, nor, in view of Authority #6, has Examiner provided "a reason apparent at time invention was made to person of ordinary skill in the art for applying the teaching at hand".

After all, most any invention merely represents a combination of old elements. The questions simply are these: i) is the combination new? and ii) if it is new, does it represent a combination that would obviously have occurred to a person of ordinary skill at the time the invention was made -- without using prohibited hindsight?

So, more specifically, Examiner must answer these questions: 1) at the time invention was made, what apparent reason would a person of ordinary skill in the art have had to combine the British reference with the Rhoads reference so as to arrive at Applicant's claimed invention? and ii) what valuable result would he have expected to attain thereby?

d) Moreover, with reference to Authority #5, except if Examiner provides evidence to the effect that "a person of ordinary skill in the art at time of applicant's invention would have expected problem to exist at all, it is not proper to conclude that invention which solves this problem ---- would have been obvious".

In other words, before a rejection of claim 118 on the basis of obviousness can be considered properly justified, Examiner must: i) identify the problem to which the claimed invention constitutes a solution, ii) provide evidence to the effect that a person of ordinary skill in the art would have expected this problem to exist, and iii) substantiate that this person would have been able to modify the applied reference in such a way as to arrive at the claimed invention.

However, in respect to the invention expressed by claim 118, it would probably be difficult to identify such a problem in that this particular invention is not directed to solving an already recognized problem. Rather, this invention came about in complex relationship with a larger and previously unenunciated opportunity; which larger opportunity, once enunciated, entailed several specific problems to be overcome, one of which related to a need for having the inverter's output referenced to ground.

In Re Independent Claims 120 and 121

Examiner rejected claims 120 and 121 under 35 U.S.C. 102(b) as being anticipated by Rhoads.

Applicant disagrees with Examiner's interpretation of the term "external load". However, to overcome that disagreement, Applicant amended claims 120 and 121 so as to more clearly distinguish them from Rhoads.

Examiner also rejected claims 120 and 121 under 35 U.S.C. 103 as being unpatentable over Rhoads in view of Walden.

Applicant traverses these rejections on basis of the various arguments provided above in connection with claim 118.

In Re Independent Claim 122

Examiner rejected claim 122 under 35 U.S.C. 103 as being unpatentable over Rhoads in view of the British reference or Walden and Locklair.

Applicant traverses this rejection for the same reasons as were provided in connection with claim 118 above.

In Re Independent Claim 124

Examiner rejected claim 124 under 35 U.S.C. 102(b) as being anticipated by Locklair.

Examiner justifies his rejection by saying that the "recitations relating to a gas discharge lamp are given no patentable weight since the lamp is not part of the claimed combination".

Applicant disagrees with Examiner on two counts:

i) There is no statutory basis for Examiner not to give patentable weight to the recitations relating to a gas discharge lamp. By way of the claim's preamble, a gas discharge lamp has been clearly identified as being a key part of the invention -- if for no other reason that the circuit must obviously function to ballast a gas discharge lamp; something that the Locklair circuit is not capable of doing.

ii) Examiner errs when he states that "the lamp is not part of the claimed combination. The claim (before amendment) comprised the following element: "connect means for connecting said gas discharge lamp in circuit with said series-combination".

Where in Locklair's circuit would Examiner propose to connect a gas discharge lamp? -- And why?

Examiner should note that the Locklair circuit would not function as a ballasting circuit.

Never-the-less, to provide for even clearer distinction between the claimed invention and the Locklair reference, Applicant has amended claim 124.

In Re Dependent Claim 125

Examiner rejected claim 125 on the same basis as he rejected claim 124; and Applicant traverses this rejection on basis of the same arguments he used in traversing the rejection of claim 124.

In Re Independent Claim 126

Examiner rejected claim 126 under 35 U.S.C. 102(b) as being anticipated by Locklair.

Applicant cancelled claim 126 and substituted in its place new claim 129.

Claim 129 basically relates to an inverter: i) being operable to provide its output power by way of a sinusoidal output voltage, and ii) having a tuned L-C combination in circuit with its output. The inverter is made to oscillate by way of positive feedback from the inverter's output, with this positive feedback being provided by way of saturable inductor means in cooperation with the tuned L-C combination.